

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
20 January 2005 (20.01.2005)

PCT

(10) International Publication Number  
**WO 2005/005773 A3**

(51) International Patent Classification<sup>7</sup>: **E21B 43/16**

(IN). MISRA, Tilak, Ram [IN/IN]; Institue Of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN).

(21) International Application Number:  
PCT/IN2004/000206

(22) International Filing Date: 14 July 2004 (14.07.2004)

(74) Agents: LAKSHMIKUMARAN, Varadharchari et al.; Lakshmikumaran & Sridharan, B-4/158, Safdarjung Enclave, New Delhi 110029 (IN).

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
892/DEL/2003 14 July 2003 (14.07.2003) IN

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(71) Applicants (for all designated States except US): THE ENERGY RESEARCH INSTITUTE [IN/IN]; Darbari Seth Block, Habitat Centre, Lodhi Road, New Delhi 110003 (IN). INSTITUTE OF RESERVOIR STUDIES [IN/IN]; Oil and Natural Gas Corporation Ltd, Jeevan Bharati, Connaught Place, New Delhi 110001 (IN).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LAL, Banwari [IN/IN]; The Energy Research Institute, Darbari Seth Block, Habitat Centre, Lodhi Road, New Delhi 110003 (IN). REDDY, Mula, Ramajaneya, Varaprasada [IN/IN]; The Energy Research Institute, Darbari Seth Block, Habitat Centre, Lodhi Road, New Delhi 110003 (IN). AGNIHOTRI, Anil [IN/IN]; Institue of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN). KUMAR, Ashok [IN/IN]; Institue of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN). SARBHAI, Munish, Prasad [IN/IN]; Institue of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN). SINGH, Nimmi [IN/IN]; Institue of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN). KHURANA, Raj, Karan [IN/IN]; Institue of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN). KHAZANCHI, Shinben, Kishen [IN/IN]; Institue of Reservoir Studies, Oil & Natural Gas Corporation Ltd, Chandekheda Campus, Ahmedabad 380005 (IN).

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declaration under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations

**Published:**

— with international search report  
— with (an) indication(s) in relation to deposited biological material furnished under Rule 13bis separately from the description

(88) Date of publication of the international search report:  
24 March 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A PROCESS FOR ENHANCED RECOVERY OF CRUDE OIL FROM OIL WELLS USING NOVEL MICROBIAL CONSORTIUM

(57) Abstract: The present invention provides a microbial consortium containing three hyperthermophilic, barophilic, acidogenic, anaerobic bacterial strains for enhanced oil recovery from oil reservoirs where temperatures range from 70 °C to 90 °C. The said microbial consortium is unique in producing a variety of metabolic products mainly CO<sub>2</sub>, methane, biosurfactant, volatile fatty acids and alcohols in the presence of specially designed nutrient medium. These metabolic products increase sweep efficiency of crude oil from oil bearing poles of rock formation. The present invention also provides a process for enhancing the oil recovery by *in situ* application of the said microbial consortium

WO 2005/005773 A3